REMARKS

Favorable reconsideration and allowance of the claims of the present application, as amended, are respectfully requested.

Before addressing the issues raised in the present Office Action, applicants have amended the specification to correct a typographical error appearing at Page 1, line 11 of the specification of the instant application. Specifically, applicants have amended that portion of the application to properly recite that the subject matter of US Serial No. 09/861,596, not 09/861,590, should be incorporated into the present application.

Claim 1 is objected to under 37 C.F.R. 1.75(c) as allegedly being of improper dependent form for failing to further limit the subject matter of the claim. Specifically, the language "said superfacial Si-containing layer having a top surface which contains a reduced number of defects so as to allow optical detection of any other defect that has a lower density than the tile or divot defect" is indefinite since there is nothing to compare what would constitute a reduced number of defects.

In response to the above objection to Claim 1, applicants have amended Claim 1 in the manner indicated supra. Specifically, applicants have deleted the indefinite terminology from the claim.

Applicants have also amended the annealing step of Claim 1 to positively recite that the same is performed in an ambient gas that comprises from about 0 to about 90% oxygen and from about 10 to about 100% of N_2. Support for this amendment to Claim 1 is found in original Claims 23 and 24.

In addition to the above amendments to Claim 1, applicants have canceled Claims 23, 24, 37-39 and 41-47, without prejudice or disclaimer, and have made amendments to Claims

25, 26, 27, 29, 30 and 33. Applicants submit that the amendments to Claims 25, 26, 27, 28, 30 and 33 are minor and are of a clerical nature; therefore no further comments regarding those amendments are deemed necessary.

Applicants have also added new Claim 48 which is directed to a method of substantially reducing the number of tile or divot defects that are present in a silicon-on-insulator (SOI) substrate, which includes, among other steps, annealing in gas ambient that comprises from about 0 to about 90% oxygen and from about 10 to about 100% of a high mobility gas selected from the group consisting of He, Kr, H_2 and mixtures thereof. Support for this newly added claim is found in canceled Claim 23.

In view of the above amendments, applicants submit that the objection to Claim 1 under 37 C.F.R. §1.75(c) has been obviated; therefore reconsideration and withdrawal thereof are respectfully requested. Pursuant to 37 C.F.R. §1.121, applicants have attached a marked-up version of the claims showing the changes made by the present amendment. The attachment is captioned "**MARKED-UP VERSION SHOWING CHANGES MADE**".

Claims 1-40 stand rejected under 35 U.S.C. §103 as allegedly unpatentable over the combined disclosures of U.S. Patent No. 6,090,689 to Sadana, et al. ("'689 patent"), U.S. Patent No. 5,534,446 to Tachimori, et al. ("Tachimori, et al.") and U.S. Patent No. 5,930,643 to Sadana, et al. ("'643 patent").

Applicants submit that they have unexpectedly determined that the use of an ambient gas comprising 0 to about 90% oxygen and from about 10 to about 100% of N_2 or a high mobility gas selected from the group consisting of He, Kr, H_2 and mixtures is capable of providing a SOI substrate that contains a superfacial Si-containing layer that has a substantial reduced number of tile or divot defects as compared to SOI substrates that are not annealed in

either of the claimed gas ambients. The reduced tiles and surface divots are not formed using conventional oxidizing ambients which include merely oxygen or a mixture of oxygen and Ar.

Applicants submit that the applied prior art references do not render the claimed methods obvious since none of the applied references teaches or suggests that a SOI substrate including a superfacial Si-containing surface having a reduced number of defects and divots can be achieved by choosing the appropriate gas ambient.

The '689 patent is defective since it does not teach or suggest a method which includes using the claimed gas ambients recited in the present invention. In contrast, the '689 patent recites that annealing is conducting in an oxidizing ambient. No specific oxidizing ambients are provided in the '689 patent therefore the choice of the annealing ambient employed therein appears to be inconsequential provided that it be capable of forming a buried oxide region in the implanted substrate. As stated above, applicants have unexpectedly determined that the use of an ambient gas comprising 0 to about 90% oxygen and from about 10 to about 100% of N_2 or a high mobility gas selected from the group consisting of He, Kr, H_2 and mixtures is capable of providing a SOI substrate that contains a superfacial Si-cotnaining layer that has a substantial reduced number of tile or divot defects as compared to SOI substrates fabricated by annealing in an oxygen ambient or oxygen admixed with Ar.

Tachimori, et al. do not alleviate the above defects in the '689 patent since the applied secondary reference discloses that similar results, in terms of reduction of defects in the buried oxide layer, can be achieved using annealing ambients such as oxygen or a mixture of oxygen and Ar, He or nitrogen. The fact that the ambients disclosed in Tachimori, et al. are capable of reducing defects in the buried oxide region, does not necessarily mean that the

same ambients can be used to improve the surface qualitity of the Si-containing layer that lays above the buried. Indeed, applicants have determined which ambients can be used to provide a SOI substrate having a superfacial Si-containing layer having a reduced number of tile and divot defects.

The '643 patent also does not alleviate the above defects in the '689 patent since the applied reference also discloses that oxygen alone, or oxygen admixed with any inert gas can be employed in producing the SOI substrate. As such, the '643 patent does not differentiate which gas ambients could be employed to provide a SOI substrate having a superficial Si-containing layer having a reduced number of tile and divots defects.

Based on the above amendments and remarks the rejections to the claims under 35 U.S.C. §103 have been obviated; therefore reconsideration and withdrawal of the instant rejections is respectfully requested.

Thus, in view of the foregoing amendments and remarks, it is firmly believed that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,

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ATTACHMENT: MARKED-UP VERSION SHOWING CHANGES MADE

IN THE CLAIMS:

Please cancel Claims 23, 24, 37-39 and 41-47, without prejudice or disclaimer, and please amend Claims 1, 25, 26, 27, 29, 30 and 33 to read as follows:

1. A method of substantially reducing the number of tile or divot defects that are present in a silicon-on-insulator (SOI) substrate, said method comprising the steps of:

(a) implanting oxygen ions into a surface of a Si-containing substrate, said implanted oxygen ions having a concentration sufficient to form a buried oxide region during a subsequent annealing step; and

(b) annealing said substrate containing said implanted oxygen ions in an ambient gas that comprises from about 0 to about 90% oxygen and from about 10 to about 100% of N_2 [under conditions wherein said implanted oxygen ions] to form said buried oxide region which electrically isolates a superficial Si-containing layer from a bottom Si-containing layer[, said superficial Si-containing layer having a top surface which contains a reduced number of tile or divot defects so as to allow optical detection of any other defect that has a lower density than the tile or divot defect].

25. (Amended) The method of Claim [23] 1 wherein said [high-surface mobility gas] ambient gas comprises 100% N_2.

26. (Amended) The method of Claim [23] 1 wherein said [high-surface mobility gas] ambient gas is admixed with Ar.

27. (Amended) The method of Claim [23] 1 wherein said annealing step is carried out at a temperature of from about 1250°C or greater for a time period of from about 1 to about 100 hours.

29. (Amended) The method of Claim [23] 1 wherein said annealing step includes a ramp and soak-heating regime.

30. (Amended) The method of Claim 1 wherein said annealing step comprises the steps of: partially annealing the Si-containing substrate containing the implanted oxygen ions in oxygen so as to form a surface layer of oxygen on the Si-containing and to partially form said BOX region; stripping the surface layer of oxygen; and continuing the annealing in said oxygen and N_2 gas ambient to complete formation of said BOX region.

33. (Amended) The method of Claim 31 wherein said inert gas comprises N_2 or a mixture of N_2 and Ar.

Please add the following new claims:

--48. The method of Claim 1 wherein said ambient gas further includes He, Kr, H_2 or mixtures thereof.

49. A method of substantially reducing the number of tile or divot defects that are present in a silicon-on-insulator (SOI) substrate, said method comprising the steps of:

(a) implanting oxygen ions into a surface of a Si-containing substrate, said implanted oxygen ions having a concentration sufficient to form a buried oxide region during a subsequent annealing step; and

(b) annealing said substrate containing said implanted oxygen ions in an ambient gas that comprises from about 0 to about 90% oxygen and from about 10 to about 100% of a high mobility gas selected from the group consisting of He, Kr, H_2 and mixtures thereof to form said buried oxide region which electrically isolates a superficial Si-containing layer from a bottom Si-containing layer.--

IN THE SPECIFICATION:

Please amend Page 1, lines 9-12 to read as follows:

--This application is related to co-assigned U.S. application No. 09/861,593; co-assigned U.S. application No. 09/861,956; co-assigned U.S. application No. 09/861,594; and co-assigned U.S. application No. 09/861,59[0]6, the entire contents of each which were filed on May 21, 2001 are incorporated herein by reference.--